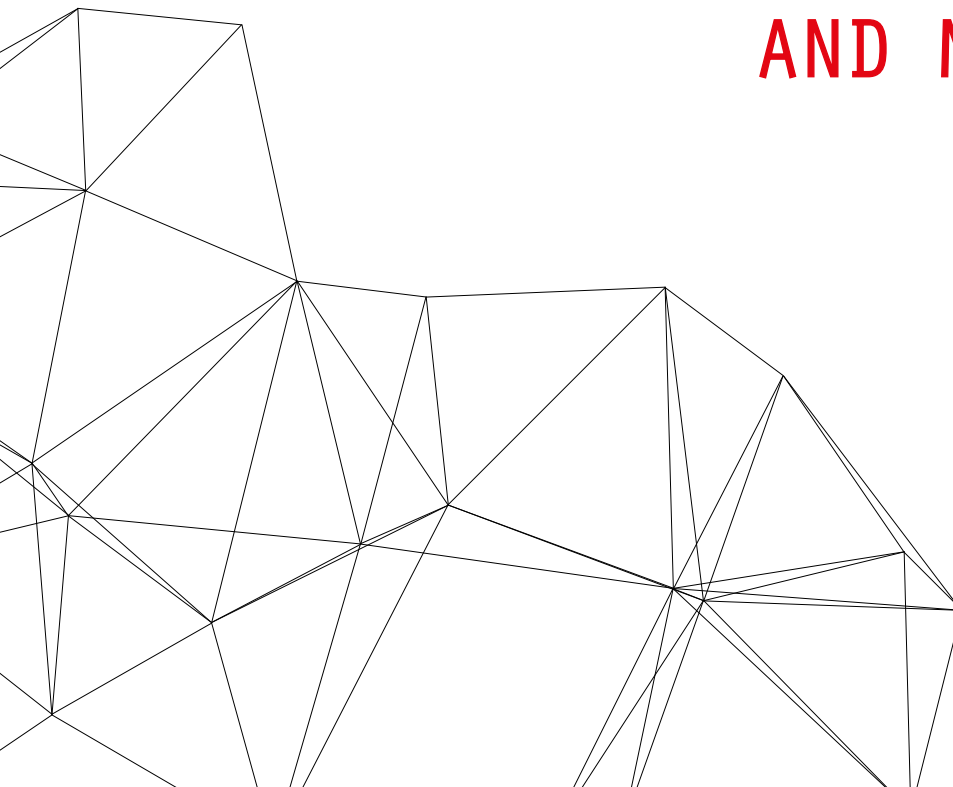
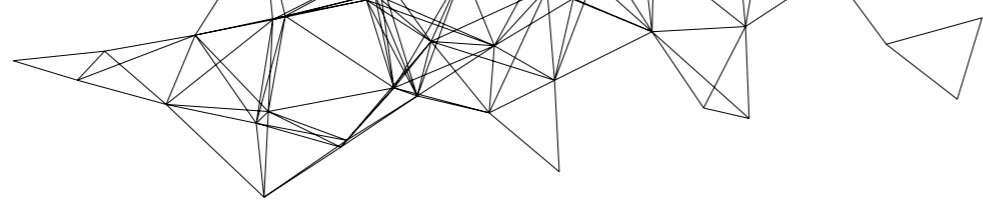


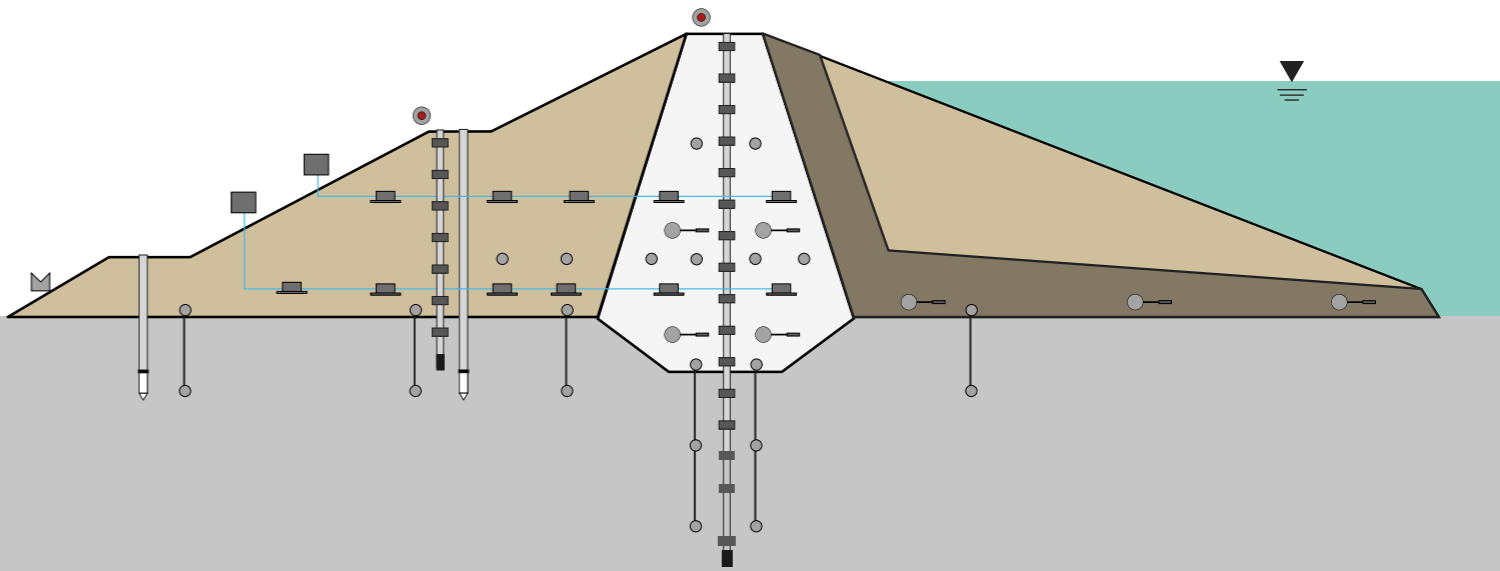
— DAMS SAFETY
AND MONITORING





EXAMPLE OF EMBANKMENT DAM MONITORING SYSTEM

Clay core dam



DAMS SAFETY AND MONITORING

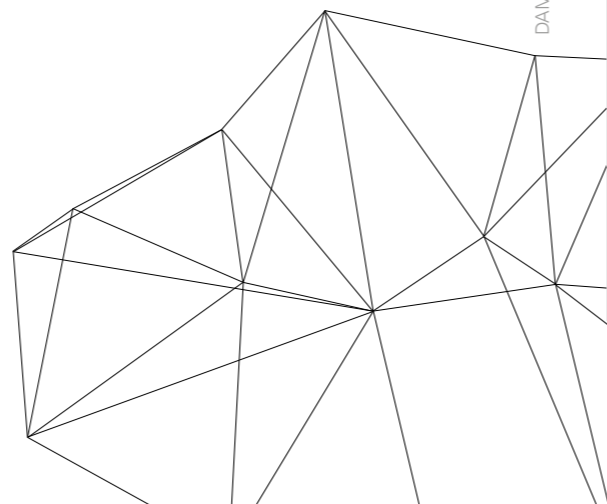
Planning a performance monitoring program is an essential component of successful dam construction and operation. Dam monitoring is recommended to ensure the safety of a dam and to control its trend.

DAM MONITORING BENEFITS

- Evaluate the initial conditions at dam site
- Safety during construction stages
- Safety during initial filling and drawdown, including basin
- Long-term monitoring of dam structure
- Monitor the performances during dam life

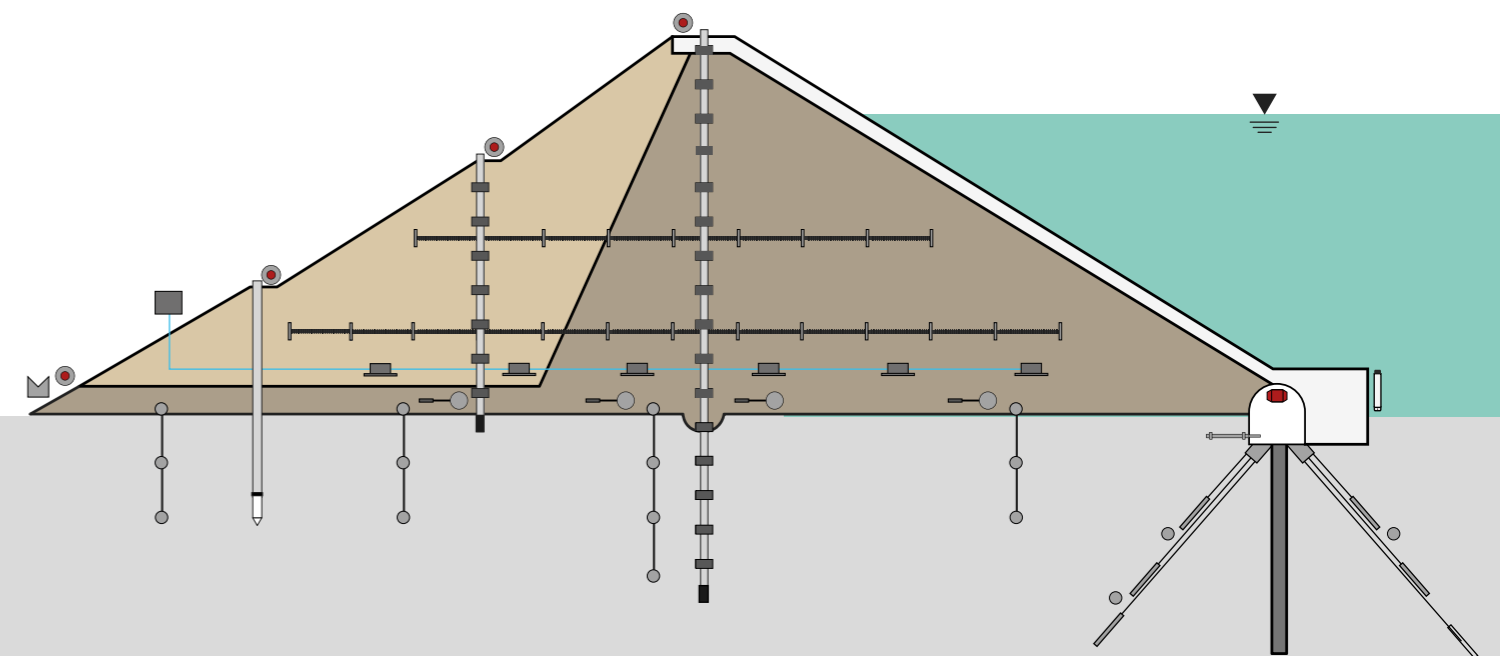
MAIN DAM TYPES

- Concrete gravity dam
- Concrete arch dam
- Embankment clay-core dam
- Embankment rock-fill dam
- RCC dam



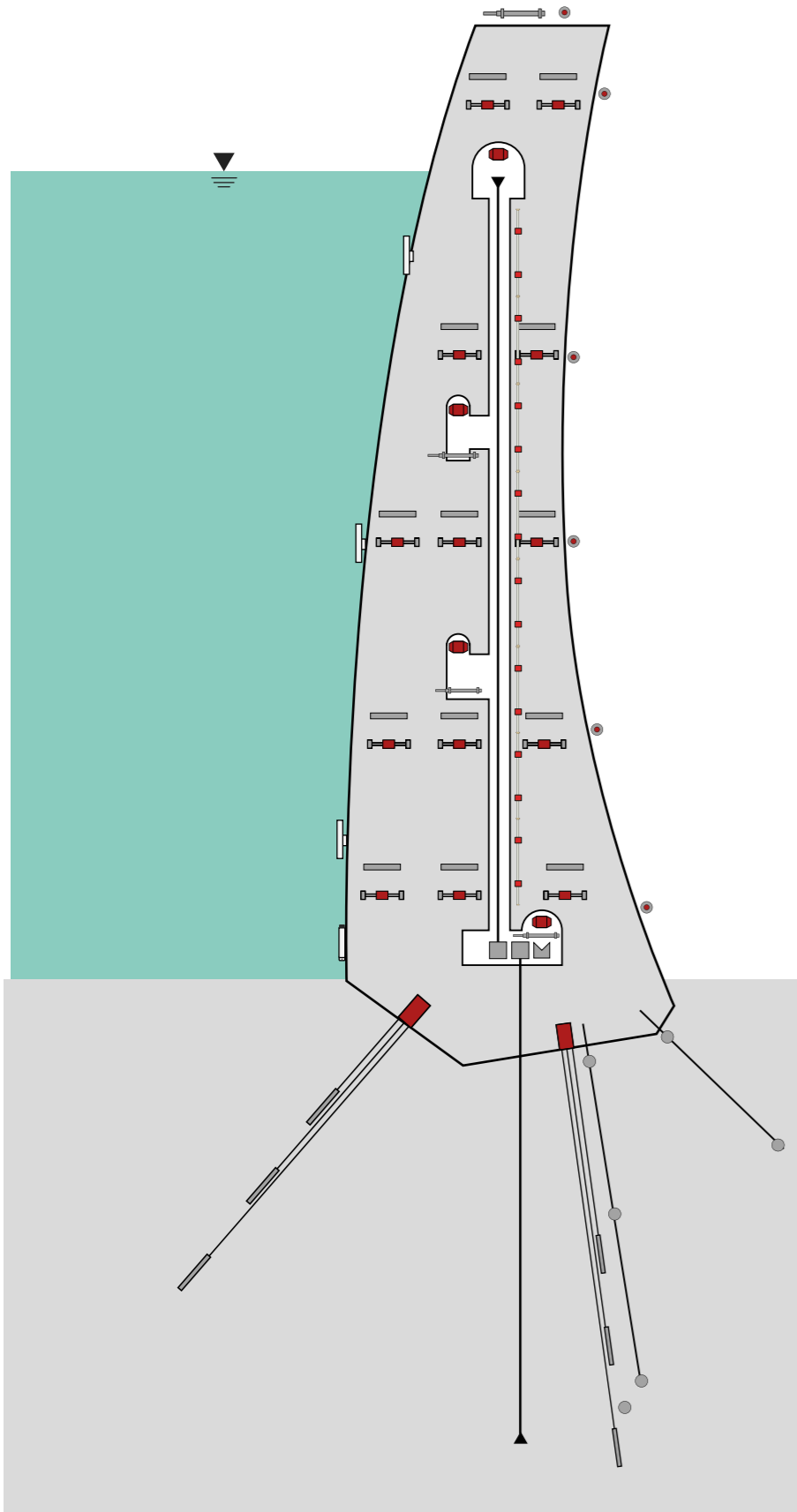
DAMS_EN_05 - 08/2021

Rock-fill dam

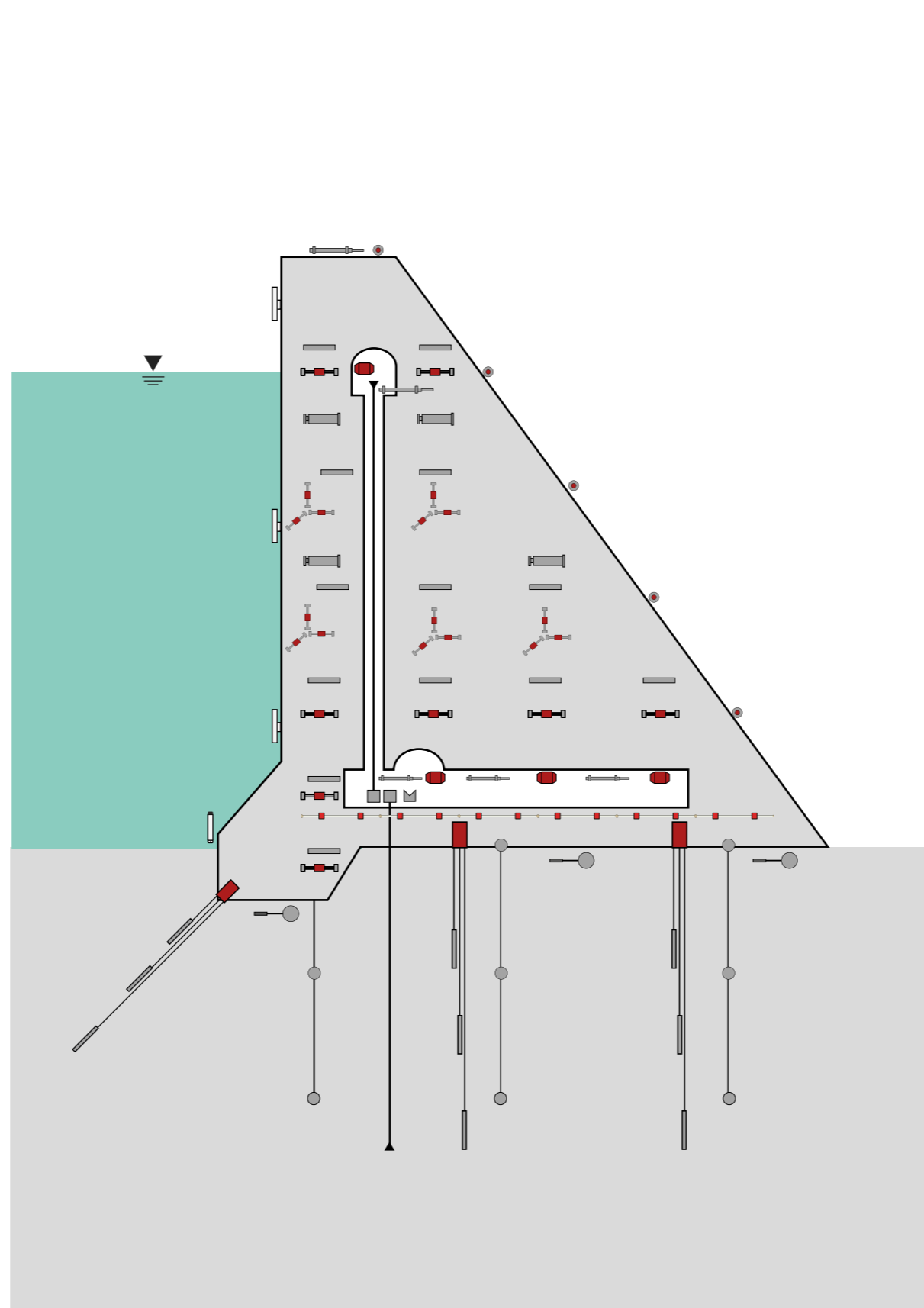


EXAMPLE OF CONCRETE DAM MONITORING SYSTEM

Arch dam



Gravity dam



INSTRUMENTS

	Direct and inverted pendulums
	Concrete embedded strain-gauges
	Embedded thermometers or thermistor strings
	3D Rosette strain gauges
	Weirs (flow meters)
	Tiltmeters
	Jointmeters
	Piezometers
	Geodetic survey points
	LT-Inclibus
	MPBX extensometers
	Submersible tiltmeters
	Relative pressure transducers
	Earth pressure cells
	Embedment jointmeters
	LLS Liquid Level Gauges
	Casagrande Piezometers
	Inclino-settlement columns
	Embankment extensometers

PURPOSES

Monitoring dam horizontal displacements
Monitoring strains within concrete mass
Evaluation of thermal curve during concrete mass curing
3-D monitoring of strains within concrete mass
Evaluation of water seepages
Local inclinations (horizontal displacement) of the structure
Surface monitoring of existing cracks or structural joints
Monitoring of pore water pressure
Topographic control of structural displacements
Verify (redundancy) dam horizontal/vertical displacement
Monitoring of settlements and displacements at different depths
Local inclinations of the structure also in underwater conditions
Monitoring of water table level in standpipes and in the basin
Total pressure between dam body and foundations or within the embankment
Monitoring of structural joints within concrete structures
Settlement monitoring within the embankment
Pore water pressure
Monitoring of horizontal and vertical embankment displacements
Monitoring of horizontal displacements within the embankment

T-1000 TELEPENDULUM



T-1000 Telependulum is designed to take automatic readings of the coordinates of pendulum's plumb line. Thanks to the new optical technology, without any moving part, it allows very high accuracy and resolution, wide measuring range and the possibility to measure plumb lines with different diameters.

T-1000 can be settled and read locally with dedicated mobile APP through Bluetooth connection, or can be integrated into automatic data acquisition system network through RS485 or 4-20mA output. T-1000 can be settled and read locally with dedicated mobile APP through Bluetooth connection, or can be integrated into automatic data acquisition system network through RS485 or 4-20mA output.

T-1000 is supplied with Calibration Report. Within the APP a tool is dedicated to check possible damages to the instrument's functionality and calibration after its delivery.

OMNIALOG DATA ACQUISITION SYSTEM

OMNIAlog data acquisition system is designed to be versatile and flexible.

By adding modular components, the system can be configured to handle the simplest or the most complex projects.

A single logger, housed in a cabinet with multiplexer expansion boards and a communications interface, can manage a large number of sensors. OMNIAlog is easily adapted for different applications by using external multiplexer boxes. Such distributed systems can be connected in a daisy chain or in star configuration to the master unit.

Recorded data can be downloaded to a USB memory stick or pushed to remote ftp servers. Alerts can be sent by SMS or email, and graphs and reports can be generated on web pages for their access anywhere.

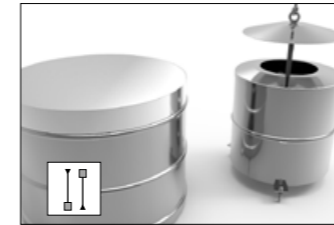
WEB MONITORING SYSTEM



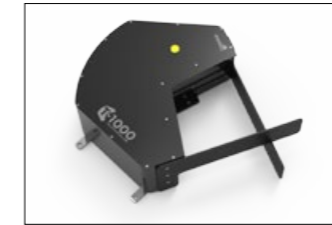
WMS is a software platform designed and developed by our sister Company "Field Srl" to validate, process, convert, manage, and automatically display data and graphs from geotechnical, structural, dynamic, meteorological and environmental monitoring systems. OMNIAlog datalogger, equipped with any communication interface, send data to a remote server that validate them, removing spikes and anomalous readings, and processes the readings converting them into engineering units in order to add them to its SQL database. The readings are then available in the form of charts or tables through the "Galemys" application. The entire process is automated so that current data are available 24 hours a day, 7 days a week. If a reading value exceeds a preset alarm threshold, WMS can send an alarm notification via SMS or an e-mail to the mobile phones of registered users.



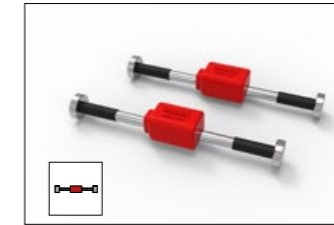
DISCOVER OUR INSTRUMENTS



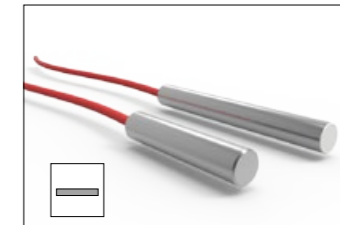
DIRECT AND INVERTED PENDULUMS



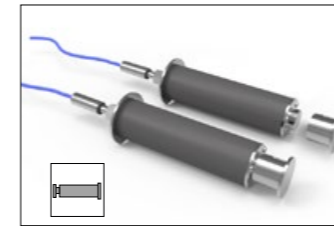
T-1000 TELEPENDULUM



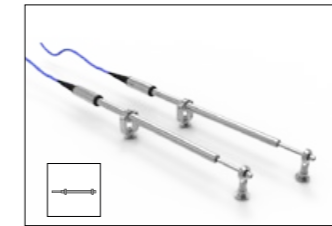
CONCRETE EMBEDDED STRAIN-GAUGES



THERMOMETERS



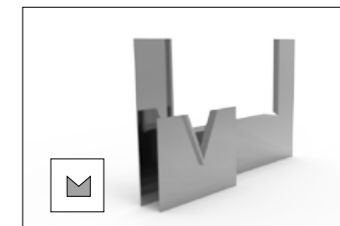
CONCRETE EMBEDMENT JOINTMETERS



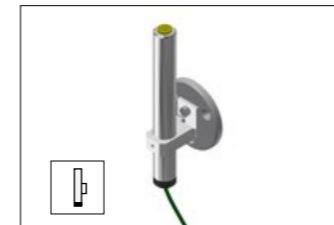
JOINTMETERS AND CRACKMETERS



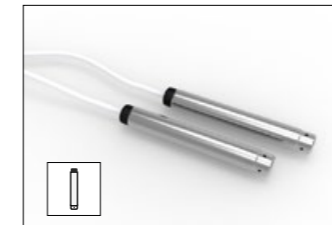
TILTMETERS (CLINOMETERS)



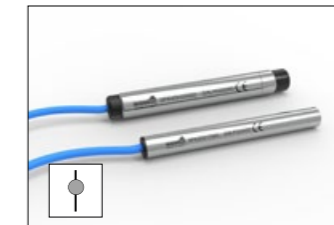
WEIRS (FLOW METERS)



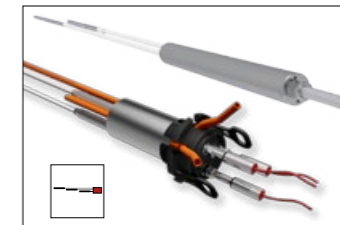
SUBMERSIBLE TILTMETERS



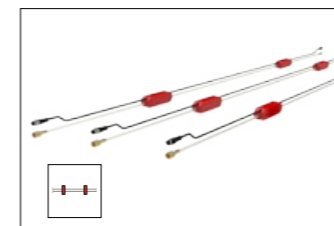
RELATIVE PRESSURE TRANSDUCERS



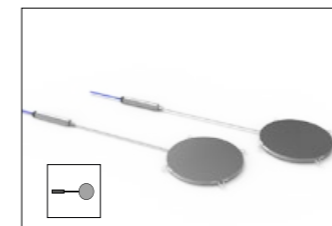
VIBRATING WIRE PIEZOMETERS



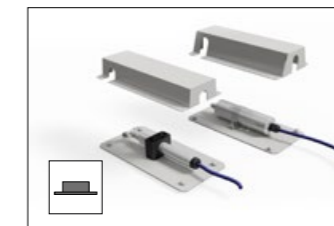
MPBX EXTENSOMETERS
MEXID MINIATURIZED MPBX EXTENSOMETERS



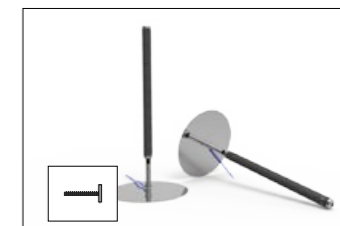
LTI-INCLIBUS



EARTH (TOTAL) PRESSURE CELLS



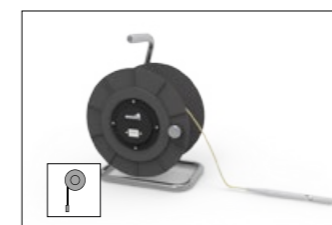
LIQUID LEVEL SYSTEM



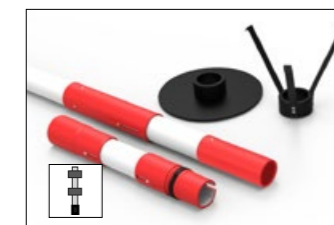
EMBANKMENT EXTENSOMETERS



CASAGRANDE PIEZOMETERS



WATER LEVEL METERS AND MAGNETIC DETECTOR PROBES



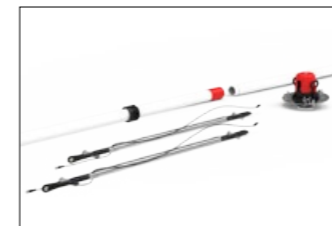
INCLINO-SETTLEMENT COLUMNS



B.R.A.IN MEMS INCLINOMETER SYSTEM



MD-PROFILE



DEX-S 3-D EXTENSO-INCLINOMETERS



MIND READOUT



OMNIA DATALOGGER

LAST REFERENCE PROJECTS

Vedi Dam, Armenia
 Songloulou Dam, Cameroun
 Asopos Dam, Greece
 Wala Dam, Jordan
 3rd LNG Tank Revithoussa island, Greece
 Dabar HPP, Serbia
 Casanuova Dam, Italy
 Kokkinolakkas Dam Chalkidiki mines, Greece
 Cerro del Aguila hydroelectric project, Peru
 Ituango Hydroelectric Project, Colombia
 Asterios Dam, Greece
 Cahora Bassa HPP, Mozambique
 Nam Ngiep 1 Hydropower Project, Laos
 Dam in Ikaria Island, Greece
 Azad Dam, Iran
 Karatzas Dam Chalkidiki Mines, Greece
 Rogun Dam, Tajikistan
 Riachuelo plant Lot 1/3, Argentina
 Neckartal Dam and Bulk Water, Namibia
 Metsovitiko Dam, Greece
 Ouldjet Mellegue Dam, Algeria
 Metolong Dam, Lesotho

Racibórz hydroproject, Poland
 Nohob Dam, Iran
 Shahri Koor Dam, Iran
 Diga Castel Giubileo Roma, Italy
 Darkas Dam, Greece
 Polrood Dam, Iran
 INGA hydroelectric project, Congo
 Beni Slimane Dam, Algeria
 Kufranja Dam, Jordan
 Qanouna Dam, Saudi Arabia
 El Quimbo project, Colombia
 Draa Diss Dam, Algeria
 Kerrada Dam, Algeria
 Sarney Dam, Iran
 Narekvari Dam, Georgia
 Avsar Dam, Turkey
 Grncarevo Dam, Serbia
 Zarqa-Ma'een and Lajjoun Dam, Jordan
 Hydroelectric project El Tornillito, Honduras
 El Cajon HPP, Honduras
 UMA OYA Multipurpose Project, Sri Lanka
 Cheraghveys Dam, Iran

 IN 25 YEARS MORE THAN
 250 INSTRUMENTED DAMS



Waterproof tilt meter on Sogamoso Dam down-stream



Inclino-settlement column with magnet plate - Polrood Dam



WW Strain gauges installed in special rosette configuration - Ulu Jelay Dam

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